REMARKS

In this response, all previously pending claims have been canceled, and new claims 21-32 have been added. Accordingly, claims 21-32 are now pending in the application.

It should be noted that in an earlier Office Action mailed on March 6, 2009, acknowledges that a declaration filed by the Applicant on December 5, 2008, was sufficient to remove the Applicant's admitted prior art as an available prior art reference against the patentability of the present patent application.

Independent claim 21, from which all other current claims in the application depend, recites a pump chamber, a pump head, and a flexible valve element. Examples of these structures are illustrated in FIGS. 1 and 7. As claimed and illustrated in FIG. 1, the pump chamber 12 has a first recess 22, and the pump head 10 has a second recess 22. The second recess cooperates with the first recess to define a valve compartment, which corresponds to either the inlet valve compartment 24 or the outlet valve compartment 26 (FIG. 1), each of which is defined as the pump head 10 and pump chamber 12 are assembled together. Thus, claim 21 is generic to both the inlet valve compartment 24 and the outlet valve compartment 26. As illustrated and claimed, an annular valve seat (32 or 38) extends into the valve compartment (24 or 26). The "opposing side of the valve compartment opposite the annular valve seat" in Claim 21

refers to the bottom of whichever recess 22 is opposite the annular valve seat (32 or 38) taken in consideration as the claim is read. For example, when the annular valve seat 32 is taken into consideration upon reading claim 21, the bottom of the inlet valve pocket 34 (FIG. 1) exemplifies the claimed "opposing side of the valve compartment."

The flexible valve element of claim 21 has notable features particularly distinguished over the prior art references of record. As shown in FIGS. 1-4, the claimed valve element, referring at once to diaphragm valves 28 and 30 of FIG. 1 and to valve 40 of FIGS. 2-4, is positioned in the valve compartment. As claimed, the flexible valve element is apertureless in that it has no apertures formed therethrough. That is, no holes or slots are formed through the valve element 40 as illustrated. The valve element has a particularly distinguished outer peripheral shape as defined by the central portion, end tabs, and connective necked down portions described as follows, but no holes are formed through the valve element within the outer peripheral shape.

Referring now to claim 21 and FIGS. 2-4, the flexible valve element 40 has a generally circular central portion 42 that is movable between the annular valve seat and the opposing side of the valve compartment, a pair of end tabs 44 that are diametrically opposed to each other with respect to the generally circular central portion 42 and that are trapped between the pump chamber and the pump head, and a pair of diametrically

opposed necked down portions 46 by which the end tabs 44 are attached to the central portion 42.

As recited in claim 21, the flexible valve element has a flat closed configuration in which a first side of the central portion 42 contacts the annular valve seat (32 or 38 in FIG. 1) and a centrally-flexed open configuration in which a second side of the central portion 42 contacts the opposing side of the valve compartment, which again refers to whichever structure opposes the annular valve seat (32 or 38) under consideration as the claim is read. FIG. 7, for example, shows the valve element in the open configuration contacting the bottom of the valve pocket 134 that defines the "opposing side of the valve compartment" in the illustrated example.

Several of the dependent claims deserve particular consideration because they provide additional points of novelty over the independent claims and because, in their context, the recitations that are generic to both the inlet valve compartment 24 and the outlet valve compartment 26 in claim 21 are rendered specific to the inlet valve compartment 24.

Dependent claim 22, for example, recites a valve compartment outlet hole particularly directed to either of the holes shown in the bottom of the valve pocket 34 in FIG. 1. Thus, in view of FIG. 1, recitations which are generic to both the inlet valve compartment 24 and the outlet valve compartment 26 in claim 21 are rendered specific

to the inlet valve compartment 24 in claim 22. As illustrated and claimed, the outlet hole is positioned off center with respect to the generally circular central portion of the flexible valve element. Such placement of the outlet hole permits a pumped medium to exit the valve compartment 26 when the flexible valve element reaches its open configuration in contact with the "opposing side of the valve compartment," which is the bottom of the valve pocket 34 in the context of claim 22, whereas centered placement of the outlet hole might cause it to be blocked by the central portion of the flexed open valve element 28.

Dependent claim 23 similarly includes two valve compartment outlet holes diametrically opposing each other as illustrated in FIG. 1 at the bottom of the valve pocket 34. Dependent claim 24, which depends from claim 23, further requires that the end tabs of the flexible valve element 28 are on a first diametrical axis of the circular central portion of the valve element, and that the two outlet holes are on a second diametrical axis perpendicular to the first diametrical axis. These distinctions are exemplified in FIG. 1 in that if the end tabs of the valve element 28 are considered to be placed at 0 and 180 degrees with regard to the circular central portion of the valve element 28, then the outlet holes in the bottom of the valve pocket 34 are considered to be placed at 90 and 270 degrees. It should be noted that dependent claim 32 provides similar recitations with regard to the two outlet holes diametrically opposing each other

on an axis perpendicular to an axis on which the rectangular portions of the recess 22 oppose each other.

Dependent claim 30 has recitations bearing similarities to those of claim 21. However it should be noted that claim 30 requires that the annular valve seat expressly recited in claim 21 extends from the pump head and that the opposing side of the valve compartment is defined by the pump chamber. Thus, in view of FIG. 1, recitations that are generic to both the inlet valve compartment 24 and the outlet valve compartment 26 in claim 21 are rendered specific to the inlet valve compartment 24 in claim 30. The remainder of claim 30 recites structures corresponding to the outlet valve compartment 26 and to the flexible valve element 30 in FIG. 1. Claim 30 thus recites a dual valve assembly exemplified by FIG. 1 overall, whereas claim 21 is more broadly exemplified by either the inlet or outlet side of the illustrated dual-valve structure.

In summary, each new claim now pending in this patent application is supported by the original specification and drawings as filed and as described herein. Thus, no new matter is added by addition of these new claims.

Rejections of Previous Claims

Prior to this response, claims 1-2 were canceled and claims 3-20 stood rejected under 35 U.S.C. § 112 due to several recitations that the Examiner asserted were

unsupported or unclear. Claims 3-20 have now been canceled as well, and thus the rejections set forth under 35 U.S.C. § 112 are now moot in that the recitations with which the Examiner took difference do not appear anywhere in newly added claims 21-32.

Previous claims 3-20 were additionally rejected under 35 U.S.C. § 103(a) as unpatentable over various combinations of four prior art references. Although the rejected claims have been canceled, the following remarks support the patentability of newly added claims 21-32 over those four references in the interest of efficient allowance of this patent application.

Patentability of the New Claims

Independent claim 21 requires, among other things, a flexible valve element having no apertures formed therethrough. That recitation is sufficient to distinguish the valve element over those of the four prior art references applied in the Office Action of October 23, 2009, each of which illustrates a flexible valve element having apertures, holes or slots either for attaching the particular valve element to a rigid structure or to permit fluid to pass through the valve element. However, further patentable distinctions of claim 21 are described below.

The valve element 40 of FIG. 3 of the present patent application, as shown below, exemplifies the valve element of claim 21. Claim 21 further requires, as shown in FIG.

3, that the claimed flexible valve element has a generally circular central portion (42), a pair of end tabs (44) that are diametrically opposed to each other with respect to the generally circular central portion, and a pair of diametrically opposed necked down portions (46) by which the end tabs are attached to the central portion.

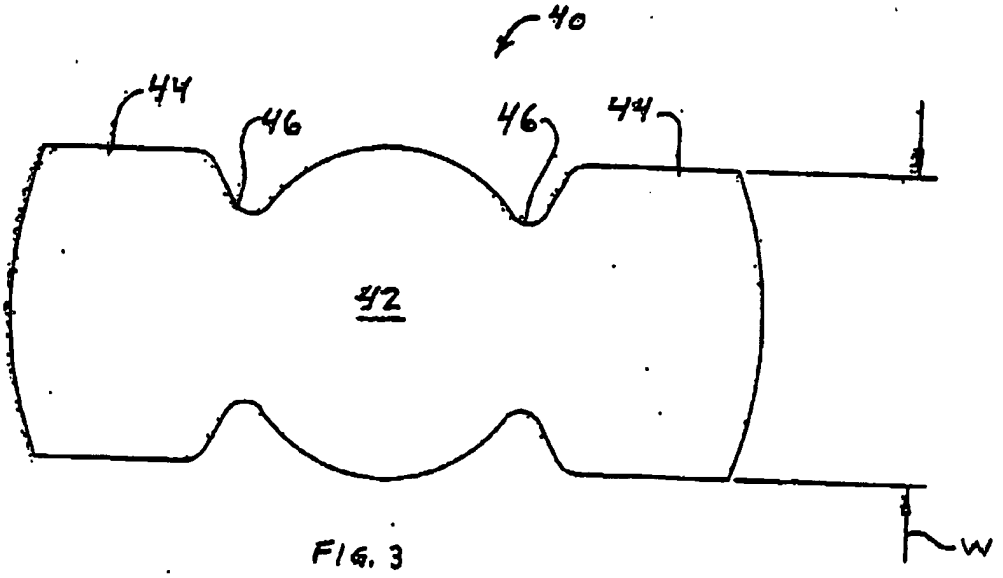


FIG. 3

(FIG. 3 of the present patent application)

The Brand patent (U.S. Patent No. 6,089,272) illustrates in FIG. 1 a valve element having a seal ring 26 located circumferentially around a valve disk 12 as described in the Abstract and in lines 25 through 43 of column 4. A support web 32 attaches the seal ring to the valve disk, and the apertures 36 formed through the support web allow the passage of fluid. By these requirements the flexible valve element of the Brand patent is generally circular, due to its having an outer "seal ring," and the vavle element has apertures formed through it. Thus the Brand patent does not anticipate the features of new independent claim 21, and cannot be said to render obvious claim 21 absent some other reference showing a valve element at least somewhat similar to that of the claim.

But the other references do not describe or illustrate valve elements bearing any similarities to the valve element of claim 21.

The Pelmulder patent (U.S. Patent No. 4,712,583) illustrates in FIGS. 1 and 2 (below) a valve element 20 having a seal ring 24 located circumferentially around a valve disk 22, and a support web 26 having apertures 32 that permit fluid to pass through the valve element as described in lines 62-68 of column 5 and lines 1-11 of column 6. Thus, the valve element 20 of the Pelmulder patent is no more similar to the valve element of claim 21 than is the valve element of the Brand patent. Indeed the

Pelmulder and Brand valve elements appear to differ only in the sealing ridge 30 and protruding bumps 28 shown in FIGS. 1 and 2 of the Pelmulder patent as shown below.

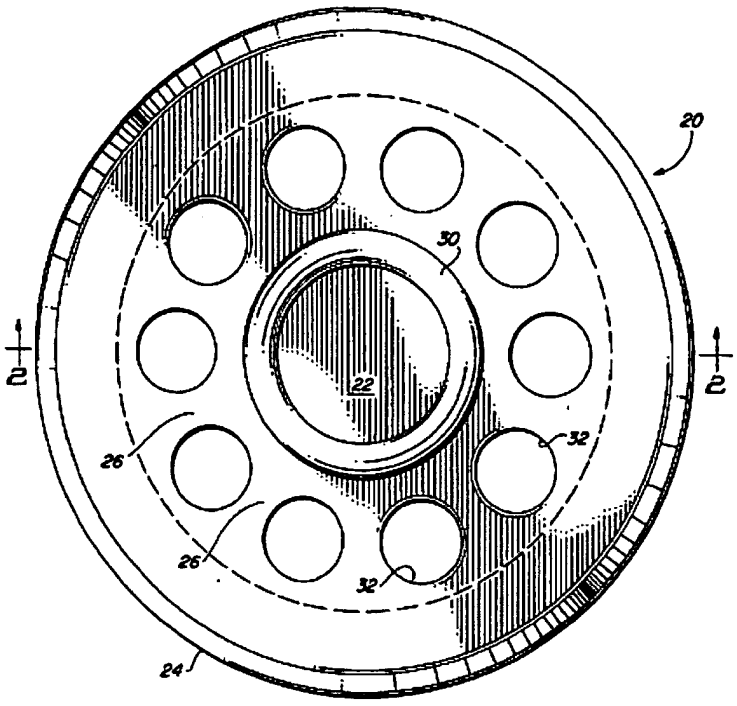


FIG. 1

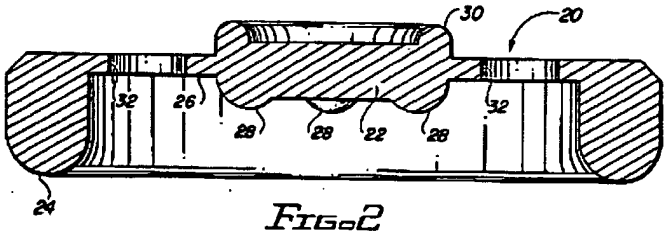


FIG. 2

(FIGS. 1 and 2 of the Pelmulder patent)

The Bolt patent (U.S. Patent No. 5,785,508) illustrates in FIG. 3 (below) a valve element 15 in which a valve flap 14 is bounded by a partial-ring shaped opening 16 almost circumscribing the valve flap as described in lines 50-58 of column 2. An opening 19 forms a "break and buffer area" in the connection region between the web 17 and the clamping area 18 as described in line 11-19 of column 3. Thus unlike the flexible valve element of claim 21, which has no apertures, the valve element 15 of the Bolt patent has both openings 16 and 19. The valve flap 14 is furthermore connected on a single side to the remaining structure of the valve element 15 by a single web 17. This further distinguishes the valve element of claim 21, which has diametrically opposed end tabs attached to the central portion.

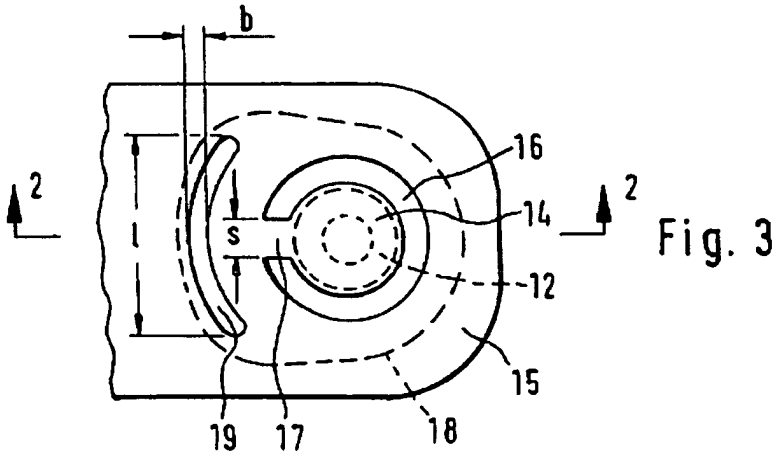


Fig. 3

(FIG. 3 of the Bolt patent)

The Knox patent (U.S. Patent No. 5,217,797) illustrates in FIGS. 2 and 3 (below) valve elements having holes formed through them. The valve element 20 of FIG. 2 has holes 21 for securing the element to a support structure using bolts as described in lines 14-23 of column 6. The valve element 30 of FIG. 3 has a central attachment hole 34 as described in lines 24-32 of column 6. Neither of the valve elements of the Knox patent has diametrically opposed end tabs attached to a central portion by necked down portions as required in claim 21 of the present patent application.

FIG. 2

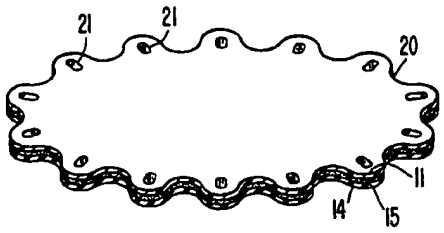
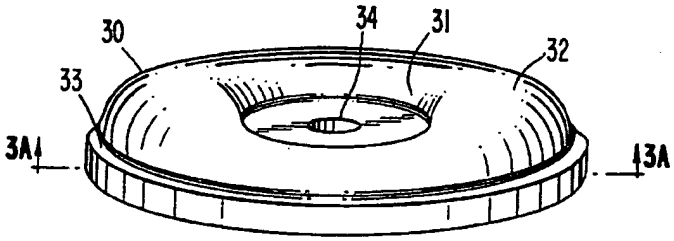


FIG. 3



(FIGS. 2 and 3 of the Knox patent)

The Brand, Pelmulder, Bolt and Knox patents do not render obvious the recitations of newly added claim 21. Though these patents have not been applied against the newly added claims of the present patent application, the Applicant has provided descriptions patentably distinguishing claim 21 over these references in the interest of efficient allowance of this patent application.

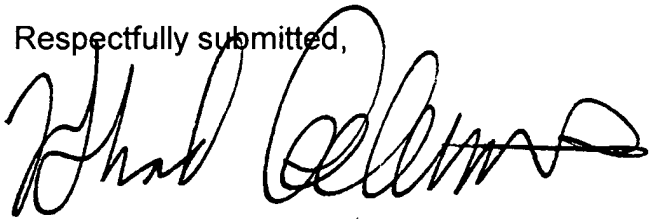
Independent claim 21 requires, among other things, a flexible valve element having no apertures formed therethrough, and having a generally circular central portion (42), a pair of end tabs (44) that are diametrically opposed to each other with respect to the generally circular central portion, and a pair of diametrically opposed necked down portions (46) by which the end tabs are attached to the central portion (reference numbers added to identify corresponding exemplary features in FIG. 3 of the present patent application). These features are not anticipated or rendered obvious by the prior-art references of record. Independent claim 21 and dependent claims 22-32 are therefore all patentable.

CONCLUSION

Based on the above amendments and remarks, Applicant believes that the application is now in condition for allowance.

The Director is hereby authorized to charge any fees or any underpayments which may be required for the above-referenced application to Deposit Account No. 01-0265. Any overpayments should be refunded to Deposit Account No. 01-0265.

Respectfully submitted,



W. Thad Adams, III
Attorney for Applicant
Reg. No. 29,037

W. Thad Adams, III
ADAMS INTELLECTUAL PROPERTY LAW
Suite 2350, Charlotte Plaza
201 South College Street
Charlotte, NC 28244
Tel: (704) 375-9249
Fax: (704) 375-0729
Email: wta@adamspat.com
File No. 2974/5US